PENDING CLAIMS AMENDED

I claim:

127. (New Claim) **A method** for increasing the oxygen volume percentage in the fuel air mixture during the oxidation process of combustible fluid hydrocarbon fuels, and for improving the combustion efficiency through reducing the density of said fuel while at the same time increasing the density of said air prior to combustion, without effecting the specified operating volumes of said fuel and said air, in all combustion mechanisms having a combustion area and at least one burner therein for converting said fuel into heat, thrust, torque, or other form of energy, comprising:

a) providing a combustion mechanism able to operate in a combustion turbine system;
b) providing combustible fluid hydrocarbon fuel as fuel for said combustion mechanism;
c) directing said fuel through the fuel supply conduit defining a heat exchanger assembly that extends through a heat transfer zone related to the combustion mechanism;
d) reducing the density of said fuel by heating the fuel as it flows through said heat exchanger assembly to an optimal fuel operating temperature level ranging between 225 degrees Fahrenheit and the fuel's auto ignition level;
e) maintaining a constant volume of density reduced combustible fuel to the combustion area of said combustion mechanism;
f) providing combustion air for the combustion process in said combustion mechanism;
g) directing said combustion air through an air supply conduit defining a heat exchanger assembly that is operated in a heat transfer zone of said combustion mechanism;
h) increasing the density of said combustion air by cooling the combustion air as it flows through said heat exchanger assembly to an optimal air operating temperature level of between 38 degrees and minus 40 degrees Fahrenheit;
i) maintaining a constant volume of density increased combustion air to the combustion area of said combustion mechanism.

128. (New Claim) A method according to Claim 127, wherein at least one of said heat transfer zones is related to the exhaust gas vent area of the combustion turbine system.

129. (New Claim) A method according to Claim 127, wherein at least one of said heat transfer zones is related to the combustion area of the combustion turbine system.

130. (New Claim) A method according to Claim 127, wherein said heat transfer zones are operated from a source other than the combustion or exhaust gas vent area of the combustion turbine system.

131. (New Claim) A method according to Claim 127, wherein the combustion mechanism converts the oxidation mixture of fuel and air into high temperature, high velocity combustion products to operate a single or dual cycle combustion turbine system.

132. (New Claim) A method according to Claim 127, wherein the combustion mechanism converts the oxidation mixture of fuel and air into high temperature, high velocity combustion products to operate a turbine engine.

133. (New Claim) A method according to Claim 127, wherein at least one of the two heat exchanger assemblies is operational.

134. (New Claim) A method according to Claim 127, wherein the fluid hydrocarbon fuel is suspended coal dust, or a coal dust slurry.

135. (New Claim) A method according to Claim 127, wherein the fluid hydrocarbon fuel is a liquid fuel.

136. (New Claim) **A device** for increasing the oxygen volume percentage in the fuel air mixture during the oxidation process of combustible fluid hydrocarbon fuels, and for improving the combustion efficiency through reducing the density of said fuel while at the same time increasing the density of said air prior to combustion, without effecting the specified operating volumes of said fuel and said air, in all combustion mechanisms having a combustion area and at least one burner therein for converting said fuel into heat, thrust, torque, or other form of energy, comprising:

a) a combustion mechanism able to operate in a combustion turbine system;

b) a fuel supply conduit defining a heat exchanger assembly located in a heating zone related to the combustion area of the mechanism, providing the means to maintain a constant supply of combustible fluid hydrocarbon fuel to the combustion area of said mechanism at a pre selected optimal operating temperature level ranging between 225 degrees Fahrenheit and the fuel's auto ignition level;

c) a combustion air supply conduit defining a heat exchanger assembly located in a

cooling zone related to the combustion mechanism, providing the means to maintain a constant volume of combustion air to the combustion area of said mechanism at a preselected optimal operating temperature level ranging between 38 degrees and minus 40 degrees Fahrenheit.

137. (New Claim) A device according to Claim 136, wherein at least one heat transfer zone is related to the exhaust gas vent area of the combustion turbine system.

138. (New Claim) A device according to Claim 136, wherein at least one heat transfer zone is related to the combustion area of the combustion turbine system.

139. (New Claim) A device according to Claim 136, wherein the heat transfer zones are related to an operating source other than the combustion or exhaust gas vent area of the combustion turbine system.

140. (New Claim) A device according to Claim 136, wherein said means to maintain a continuous volume of fluid hydrocarbon fuel to the burners in the combustion area of the mechanism at said optimal fuel temperature level operates within a preselected operating temperature range between 225 degrees and 900 degrees Fahrenheit.

141. (New Claim) A device according to Claim 136, wherein a preselected volume of combustion air is routed through a contained duct system which provides temperature control and the means for density increase of said combustion air volume by cooling the air to a preselected temperature range below ambient prior to combustion.

142. (New Claim) A device according to Claim 136, which provides the means for the combustion mechanism to convert an oxidation mixture of fuel and air into high temperature, high velocity combustion products for the purpose of operating a turbine system.

143. (New Claim) A device according to Claim 136, wherein the combustion mechanism converts the oxidation mixture of fuel and air into high temperature, high velocity combustion products to operate a single or dual cycle combustion turbine system.

144. (New Claim) A device according to Claim 136, wherein the combustion mechanism converts the oxidation mixture of fuel and air into high temperature, high velocity combustion products to operate a turbine engine.

145. (New Claim) A device according to Claim 136, wherein the fluid hydrocarbon fuel is a fluid fuel other than natural gas or propane gas.

146. (New Claim) A device according to Claim 136, wherein the fluid hydrocarbon fuel is suspended coal dust, or a coal dust slurry.

147. (New Claim) A device according to Claim 136, wherein at least one of the two heat exchanger assemblies is operational.

Canadian Gas Research Institute
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CGRI

FACSIMILE COVER SHEET

TO: Mr. W. H. Velke, President.	FROM: Martin Thomas
OF: Tylon Prototype Inc.	DATE: 27 April 1999
CITY/PROV: Campellville, Ontario.	TIME SENT: 9 : 28 am
FAX No: (905) 659 3013	

This Message Consists of 3 Page(s) including this one.
If you do not receive the entire message, please telephone.

MESSAGE: Re. CGRI Response to your letter of 18 April, 1999, regarding the Tylon Fuel Saver Technology.

Dear Mr. Velke,

Please find attached a copy of CGRI's response to your letter dated 18 April, 1999, regarding CGRI's evaluation of the Tylon Fuel Saver Technology.

The original has been sent by mail with the ITS test report enclosed.

Yours sincerely,

M. Thomas

from the desk of...

Martin Thomas
Research Engineer

Canadian Gas Research Institute
Institut Canadien des Recherches Gazières

60 Granton Drive, Units 9, 10, Richmond Hill, Ontario L4B 2N6
Telephone: (905) 707-7247 Fax: (905) 707-1913

CGRI.

Mr. William H. (Bill) Velke,
President,
Tylon Prototype Inc.,
P.O. Box 154, 277 Campbellville Road,
Campbellville, Ontario, Canada, L0P 1B0.

27th April 1999

Re. Your letter dated April 18, 1999 regarding CGRI's Evaluation of the Tylon Fuel Saver Technology.

Dear Mr. Velke,

CGRI has reviewed your letter of response to CGRI's evaluation of The Tylon Fuel Saver Technology and we are of the opinion that :

1. Our conclusion that a fuel consumption reduction is consistent with an increase in fuel temperature is still valid (your own results indicate this).

2. As per our previous evaluation, the claim for an energy output increase is not supported by the data presented in the ITS report. An industry practice, for estimating air mass flow, used for appliance certification purposes does not necessarily constitute an acceptable scientific proof.

3. As previously explained, a reduction in the CO concentration from the increased propane temperature, increased volume flow and decreased mass flow was expected. Given the new information provided on the accuracy of the instrumentation used, the results can be said to be statistically valid.

   Reductions in CO are achieved by optimising the air/fuel ratio somewhere close to stoichiometric, achieving good air/fuel mixing and preventing flame quenching. In your case the increased volume flow (reduced mass flow) probably improves the air/gas mixing and provides an increased air/fuel ratio.

4. CGRI is still unable to explain, on a thermodynamic basis, why there would be an increase in heat output when the heat input is reduced and the heat losses remain constant.

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On some of your other points:

- Flame intensity and flame temperature do not affect the total energy output of a burning fuel, i.e. the total energy output of a combusted fuel is purely a function of the total energy input in the fuel and air before they are combusted.

- Oxygen enrichment of the combustion air (i.e. increasing the oxygen concentration of the combustion air) is a well established industrial process improvement technique. In our opinion, the Tylon Fuel Saver Technology does not provide oxygen enrichment. To our knowledge, oxygen enrichment can only be achieved by adding oxygen to air or by removing the other constituents (nitrogen, CO_2, argon, etc.) from air, thereby increasing the concentration of the oxygen in the air. Therefore we cannot support the claims made for the Tylon Fuel Saver Technology as a result of improvements caused by oxygen enrichment.

Because CGRI is unable to explain, through sound scientific principles, the claimed / measured benefits of the Tylon Fuel Saver Technology, we cannot recommend this device for consideration by ETV Canada. In consequence, we feel that it would be in the best interests of Tylon Prototype Inc. that CGRI no longer be involved in the evaluation process.

All material generated to date will, of course, remain confidential between ourselves (to that end we return your ITS report) and we thank you for providing CGRI with the opportunity to be of service to you.

In view of our withdrawal from any further evaluation, of the Tylon Fuel Saver Technology or material relating to it, we will not be invoicing you for the time taken to prepare this response. Any future efforts, however, will be invoiced at our standard rates.

Yours sincerely,

M. Thomas

cc: Roger Barker, General Manager & COO, CGRI.

from the desk of...

Martin Thomas
Research Engineer

Heat Input Increase

Improved combustion efficiency is an improvement in the conversion of the fuel into Carbon Dioxide (CO_2) and Water (H_2O). This is evidenced by a reduction in the volume of Carbon Monoxide (CO) emissions.

Volume of CO with Tylon Activated = 2.84 in^3 = 0.0465394 dm^3 = 0.00208 mol

Volume of CO with Tylon Bypassed = 4.61 in^3 = 0.0755445 dm^3 = 0.00337 mol

The Enthalpy of formation of Carbon Dioxide and Carbon Monoxide are:

ΔH_f CO = -110.5 kJ/mol

ΔH_f CO_2 = -393.5 kJ/mol

Difference between CO and CO2 energy release = 283 kJ/mol

Difference in CO emitted = 0.00129 mol

Therefore the additional energy released due to improved combustion efficiency, when the Tylon Fuel Saver is Activated

= 0.00129 x 283 = 0.36507 kJ = 0.346 Btu

The furnace used 3.174 ft^3 of Propane in 10 minutes when the Tylon Fuel Saver was activated. Therefore in 5 minutes 1.587 ft^3 was consumed.

The calorific value of the Propane used was 2500 Btu/ft^3.

Therefore in 5 minutes 3967.5 Btu were input to the furnace as chemical energy in the fuel.

CGRI has in the past calculated the increased energy input due to the higher temperature of the fuel when the Tylon Fuel Saver is activated. This equates to 75.4 kJ/m^3 or 2.024 Btu/ft^3, which in 5 minutes was 3.212 Btu.

It can thus be said that the increase in energy input to the furnace due to fuel heating and an improvement in combustion efficiency was 3.558 Btu.

That is, **an increased energy input of 0.09 %** (This analysis did not include a possible improvement to the low level of propane slippage that can occur on burner ignition and extinction, as it was not measured. However, it would not be expected to add a significant amount to the increase in energy input).

The above increase in energy input is far outweighed by the measured decrease in fuel volume (2.3%) to the furnace due to the change in thermophysical properties of the fuel and temperature effects on the combustion system (orifice, burners, etc).

Furnace Efficiency

CGRI has in the past calculated a few snapshot efficiencies from the data provided by ITS, see below.

Tylon Flue Loss Efficiency

For Cycle # 2

Activated

Time	Flue CO_2 %	Flue Temperature after Tylon (F)	Combustion Air Temperature (F)	Delta T (F)	Flue Loss %	Efficiency %
0						
1	6.6	212	58.9	153.1	15	85
2	6.3	275.6	60	215.6	17.5	82.5
3	6.26	318.1	59.7	258.4	19	81
4	7.34	342.8	58.5	284.3	18.75	81.25
5	6.44	359	60.8	298.2	20	80
6	6.4	369.2	59.1	310.1	20.5	79.5
7	6.42	374.4	59.8	314.6	20.75	79.25
8	6.35	378	59.5	318.5	21	79
9	6.44	379.3	59.9	319.4	21	79
10	6.4	380.4	60.1	320.3	21	79

Bypassed

Time	Flue CO_2 %	Flue Temperature after Tylon (F)	Combustion Air Temperature (F)	Delta T (F)	Flue Loss %	Efficiency %
0						
1	5.99	168.8	58.4	110.4	14.9	85.1
2	6.33	253.2	58.6	194.6	16.75	83.25
3	6.36	304.4	59.6	244.4	18.5	81.5
4	6.46	337.4	60	277.4	19.5	80.5
5	6.49	358.2	60.7	297.5	20	80
6	6.54	369.8	60.4	309.4	20.5	79.5
7	6.51	377.6	60.6	317	20.75	79.25
8	6.54	382.2	60.4	321.8	21	79
9	6.54	385.1	61.4	323.7	21	79
10	6.56	387	60.7	326.3	21	79

For Cycle #8

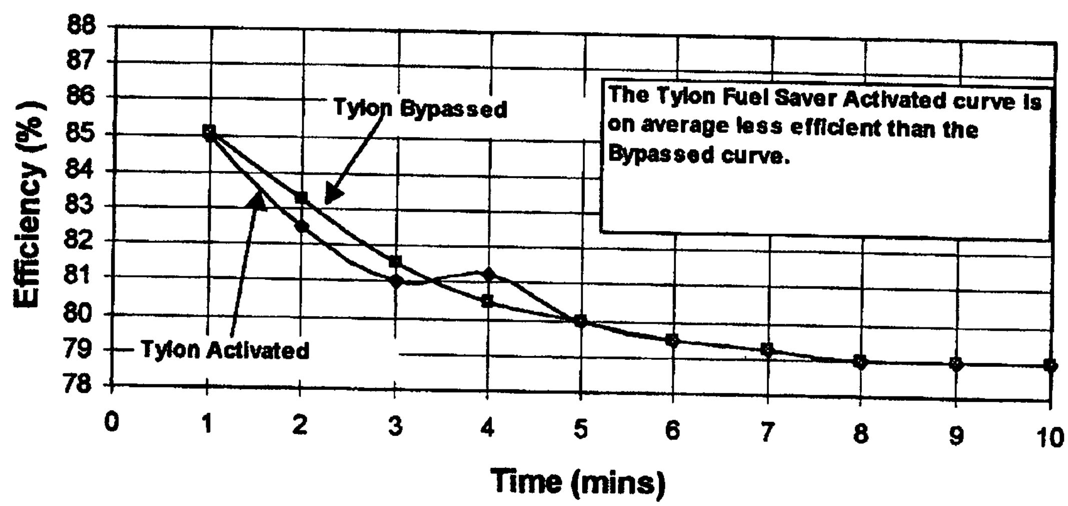
Activated

Time	Flue CO_2 %	Flue Temperature after Tylon (F)	Combustion Air Temperature (F)	Delta T (F)	Flue Loss %	Efficiency %
0						
1	5.86	214.2	58.3	155.9	15.75	84.25
2	6.26	277.8	59.3	218.5	17.5	82.5
3	6.36	317.7	60.6	257.1	19	81
4	6.34	343.2	61.2	282	19.75	80.25
5	6.36	359.1	61.3	297.8	20.25	79.75
6	6.41	368.1	61.3	306.8	20.5	79.5
7	6.31	373.1	61.7	311.4	20.75	79.25
8	6.31	376.7	60.5	316.2	21	79
9	6.31	379.2	61.1	318.1	21	79
10	6.33	380.7	61.5	319.2	21	79

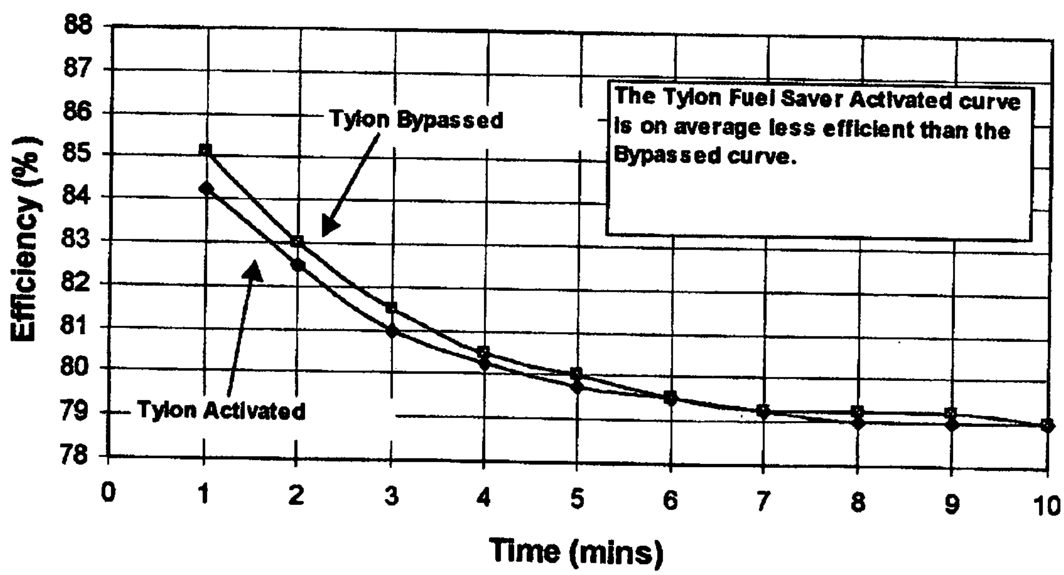
Bypassed

Time	Flue CO_2 %	Flue Temperature after Tylon (F)	Combustion Air Temperature (F)	Delta T (F)	Flue Loss %	Efficiency %
0						
1	5.98	168.1	59.5	108.6	14.9	85.1
2	6.19	253.8	59.8	194	17	83
3	6.32	305.6	59.9	245.7	18.5	81.5
4	6.45	338.1	60.2	277.9	19.5	80.5
5	6.47	357.8	60.5	297.3	20	80
6	6.48	370.1	60.8	309.3	20.5	79.5
7	6.54	377.4	60.3	317.1	20.75	79.25
8	6.53	382.6	61.2	321.4	20.75	79.25
9	6.54	385.1	60.7	324.4	20.75	79.25
10	6.56	387.3	61.1	326.2	21	79

Tylon Fuel Saver (Furnace Cycle 2)



Tylon Fuel Saver (Furnace Cycle 6)



These overall efficiency figures were calculated using the "flue loss method". This method determines the sensible and latent energy lost in the combustion products going up the flue. The figures are determined by temperature differences between what goes in and what comes out and also from the flue Carbon Dioxide concentration, which gives an indication of the excess air level in the flue.

The Efficiency determined using this method includes both the energy output in the load air and the energy lost from the furnace to its surroundings.

The energy lost from the furnace to its surroundings (casing or jacket losses) was not measured, however they are generally not very high and for a furnace would contribute to the heating of a house. It is CGRI's opinion that the casing losses would not have changed significantly when the Tylon Fuel Saver was activated as compared to its being bypassed, during the ITS testing.

In Conclusion

There was a net decrease in the energy supplied to the furnace and an increase (or no change) in the energy being lost up the flue, so unless there was a significant change in the casing losses (which cannot be determined) there is no explanation for the dramatic increase in energy output in the load air being claimed.

CGRI is unwilling to support any claim that implies that the first law of thermodynamics is being broken.